ABB Procontic Programming System

907 KP 95
CE definitions for the
communication module 07 KP 95

Order No.: GJP5 2066 00 R0102

Software Registration Form / Individual License General License Conditions for the Supply of Computer Software upon Payment of a Non–Recurring License Fee (ALCN) / Floppy Disks **1**

Hardware 07 KP 95 **2**

Installation **3**

Examples **4**

5

6

Connection element library **7**

8

9

10

09.97

24 mm

59 mm

ABB Procontic Programming System

907 KP 95
CS31

GJP5 2066 00

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907 KP 95
CS31

GJP5 2066 00

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907 KP 95
CS31

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907 KP 95
CS31

GJP5 2066 00

Notes on completing the software registration forms

Please complete the software registration forms in full and using a typewriter or in block capitals. Please return the "Double" to ABB. Do not forget to sign the software registration forms!

The software registration form should contain the following information in order to prevent difficulties or delays in provision of software updates for you:

Licensee

Name or company:	Full company name
Department/Contact person/Phone:	Name of department, name and telephone number of the contact person
Address:	Street/road and number or P.O.Box,country code, postal code, town/city
Date of delivery: (as defined in ALCN 4.1)	Already completed (if you do not have this information, please enter the date of receipt)
Name/legally binding signature:	Name in block capitals and signature

Customer Hardware (PC)

Hardware manufacturer:	Manufacturer of the PC used (e.g. Compaq)
Type:	Precise type designation of the PC used (e.g. 80486DX)

Software Product

Product name:	Designation of the software (e.g. 907 PC 331; already completed)
Version:	Version number (already completed)
Identification No.:	Identification No. of the software (already completed)
Serial No.:	Diskette creation date (e.g. 12.92 = Dec. 92; already completed)
ABB order No. or ABB office:	ABB order No. or ABB field office which supplied the software (already completed)
New software version should be offered according to ALCN 6.2:	State whether new software versions are to be offered in accordance with ALCN 6.2

Specification in accordance with Item 5.2 ALCN

General

The programming of the communication processor is carried out in the PLC program with a PC using the programming and test system 907 PC 331.

The programming software 907 KP 95 provides all connection elements necessary for operating the communication processor 07 KP 95:

- AF100
- DSPIN
- DSPOUT
- DWREAL
- REALDW

The communication processor 07 KP 95 allows interfacing of ABB Procontic CS31 to the AF100 (Advant Fieldbus 100). The communication processor 07 KP 95 **needs** additionally a communication interface **CI520** and an appropriate bus modem. The 07 KP 95 contains the carrier board for the CI520 (similar to the Submodule Carrier Board with the Advant Controller 450, but the 07 KP 95 has only one slot for **one** CI520).

Features of the unit 07 KP 95

The following functions are supported by the 07 KP 95:

– master or slave at the AF100 (function block AF100)

– single-channel or redundant configuration of the AF100 (selectable via the function block AF100)

– transmission of cyclic data using the function blocks DSPIN and DSPOUT (max. 475 DSPs with 8 DATs, max. 250 DSPIN and 249 DSPOUT)

– service data: station, type, version, status

– no event handling

– no time-sync

– no program-load

Survey of Advant Fieldbus (AF100), 07 KP 95 and ABB Procontic CS31

– The AF100 is a field bus, to which a maximum of 80 AF100 stations (nodes) can be connected. Each station can be a master or a slave. At least one master must be connected to an AF100, several masters are possible.

– The AF100 distinguishes between **process data**, which are transmitted cyclically (Cyclic Data Packages) and **messages** (diagnosis data, events), which are only transmitted if necessary.

– The AF100 can be configured in single–channel mode or redundant. In the redundant configuration, the data are always sent via both busses. The data, however, are only received from one bus. The switch–over to the bus, from which the data is received, is performed automatically by the hardware.

– The transmission medium for the AF100 can be a twisted pair, a coaxial cable or an optical fiber. For the connection between the coupler and the AF100 bus, an appropriate modem must be selected.

– For the transmission of cyclic data on the Advant Controller side, the data base element DSP (Data Set Peripheral) is available. Each DSP can contain up to 8 data elements (DATs) of the types boolean, integer, long integer or real. In the data base element, the following is given: the number of DATs, the transmission interval, the direction (sending or receiving DSP), the identification and the station number.

– Analog to that, on the CS31 side there are the function blocks DSPIN (receiving DSP) and DSPOUT (sending DSP). As a maximum, a number of 475 DSPs with 8 DATs each can be configured. The max. number of function blocks is 250 DSPINs and 249 DSPOUTs.

– For initialization, the function block AF100 is available (station number, master/slave, AF100 bus single/redundant).

Operating Manual
Hardware

ABB Procontic CS31
Intelligent Decentralized
Automation System

07 KP 95 R101
Communication processor

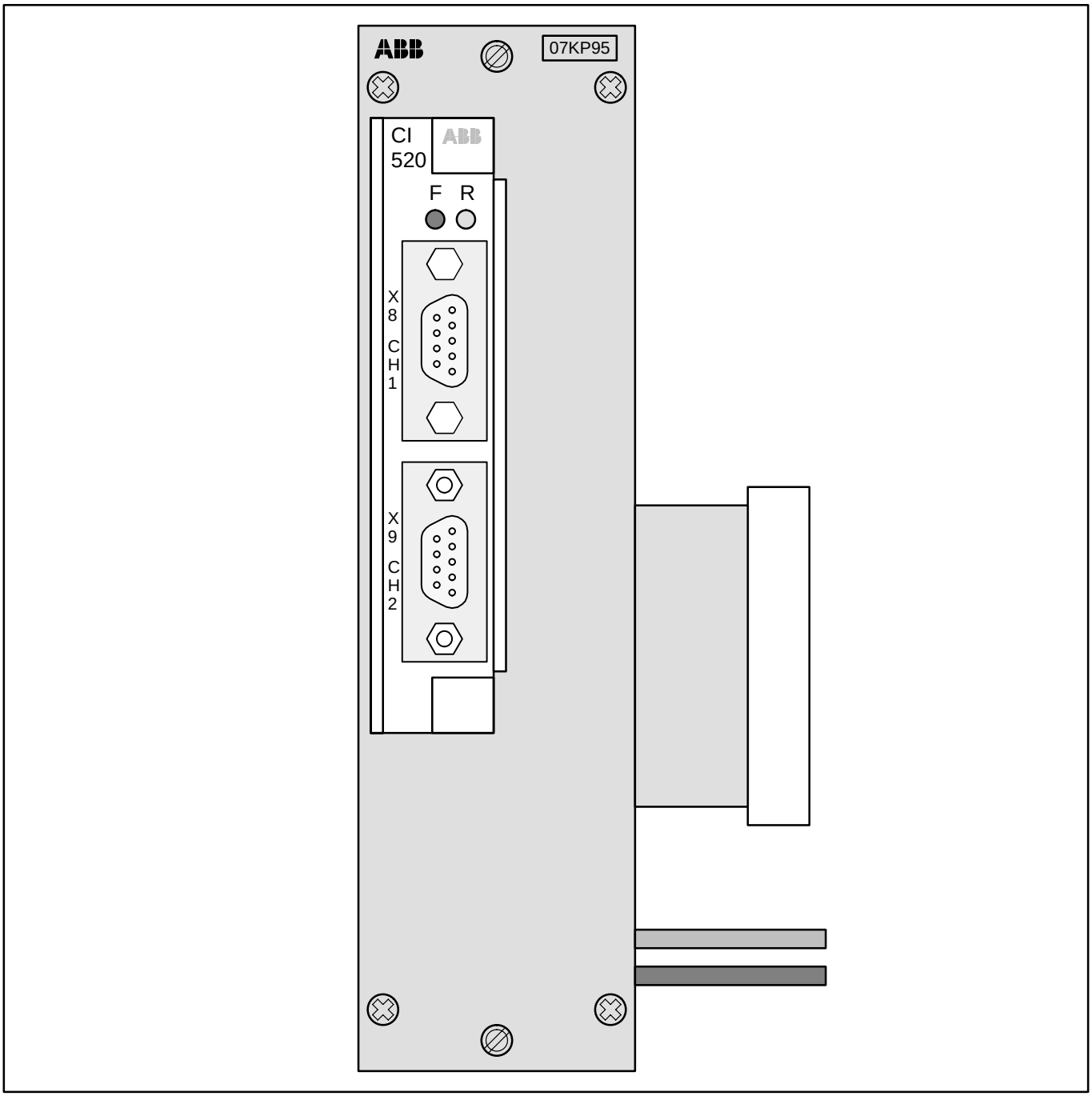

ABB Schalt–
und Steuerungstechnik

Regulations
Concerning the Setting up of Installations

Apart from the basic ”Regulations for the Setting up of Power Installations” DIN VDE* 0100 and for ”The Rating of Creepage Distances and Clearances” DIN VDE 0110 Part 1 and Part 2 the regulations ”The Equipment of Power Installations with Electrical Components” DIN VDE 0160 in conjunction with DIN VDE 0660 Part 500 have to be taken into due consideration.

Further attention has to be paid to DIN VDE 0113 Part 1 and Part 200 in case of the control of working and processing machines. If operating elements are to be mounted near parts with dangerous contact voltage DIN VDE 0106 Part 100 is additionally relevant.

If the protection against direct contact according to DIN VDE 0160 is required, this has to be ensured by the user (e.g. by incorporating the elements in a switch-gear cabinet). The devices are designed for pollution severity 2 in accordance with DIN VDE 0110 Part 1. If higher pollution is expected, the devices must be installed in appropriate housings.

The user has to guarantee that the devices and the components belonging to them are mounted following these regulations. For operating the machines and installations, other national and international relevant regulations, concerning prevention of accidents and using technical working means, also have to be met.

The ABB Procontic devices are designed according to IEC 1131 Part 2. Meeting this regulation, they are classified in overvoltage category II which is in conformance with DIN VDE 0110 Part 2.

For the direct connection of ABB Procontic devices, which are powered with or coupled to AC line voltages of overvoltage category III, appropriate protection measures corresponding to overvoltage category II according to IEC–Report 664/1980 and DIN VDE 0110 Part 1 are to install.

Equivalent standards:

DIN VDE 0110 Part 1 ≙ IEC 664
DIN VDE 0113 Part 1 ≙ EN 60204 Part 1
DIN VDE 0660 Part 500 ≙ EN 60439–1 ≙ IEC 439–1

All rights reserved to change design, size, weight, etc.

* VDE stands for ”Association of German Electrical Engineers”.

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1 Communication processor 07 KP 95 R101
Communication over the Advant Fieldbus 100

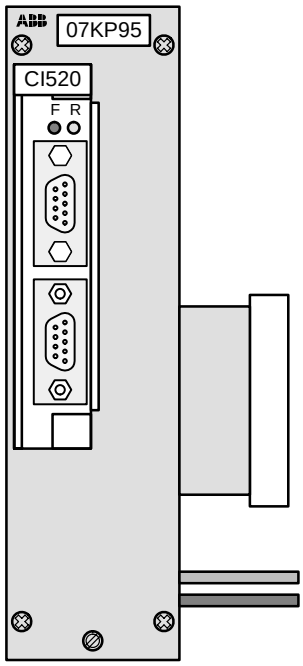

Fig. 1: Communication processor 07 KP 95 R101

Contents

1.1 Brief description 1
1.2 Features of the unit 07 KP 95 1
1.3 Survey of Advant Fieldbus (AF100), 07 KP 95 and ABB Procontic CS31 2
1.4 Structure of the front panel 2
1.5 Electrical connection 2
1.5.1 Application examples for AF100 coupling with modem, coupler 07 KP 95 and central unit 2
1.5.2 Connection of the supply voltage 5
1.5.3 Networking interface 5
1.5.4 Measures for RFI 5
1.7 Technical data 6
1.8 Ordering data 8

1.1 Brief description

The communication processor 07 KP 95 allows interfacing of ABB Procontic CS31 to the AF100 (Advant Fieldbus 100). The communication processor 07 KP 95 **needs** additionally a communication interface **CI520** and an appropriate bus modem. The 07 KP 95 contains the carrier board for the CI520 (similar to the Submodule Carrier Board with the Advant Controller 450, but the 07 KP 95 has only one slot for **one** CI520).

The programming of the communication processor is carried out in the PLC program with a PC using the programming and test system 907 PC 331.

The programming software 907 KP 95 provides all connection elements necessary for operating the communication processor 07 KP 95:

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- DSPOUT
- DWREAL
- REALDW

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The following functions are supported by the 07 KP 95:

– master or slave at the AF100 (function block AF100)
– single-channel or redundant configuration of the AF100 (selectable via the function block AF100)
– transmission of cyclic data using the function blocks DSPIN and DSPOUT (max. 475 DSPs with 8 DATs, max. 250 DSPIN and 249 DSPOUT)
– service data: station, type, version, status
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1.3 Survey of Advant Fieldbus (AF100), 07 KP 95 and ABB Procontic CS31

– The AF100 is a field bus, to which a maximum of 80 AF100 stations (nodes) can be connected. Each station can be a master or a slave. At least one master must be connected to an AF100, several masters are possible.

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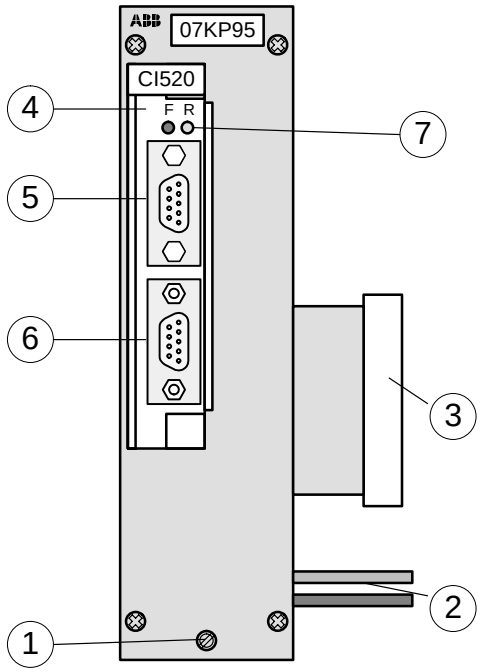
– For initialization, the function block AF100 is available (station number, master/slave, AF100 bus single/redundant).

1.4 Structure of the front panel



1 Fixing screws above and below
for fastening on the earthed mounting surface. With this fastening the earthing for the coupler is also performed.

2 Supply voltage 24 V DC (red = L+, blue = M)

3 Networking interface for the ABB Procontic CS31 central unit (07 KT 93)

4 Communication interface CI520

5 Serial interface for modem coupling

6 Second serial interface for another modem
(in case of redundant operation)

7 LEDs
red (F) = Fault
green (R) = Ready

Fig. 2: Communication processor 07 KP 95 with reference points

1.5 Electrical connection

1.5.1 Application examples for AF100 coupling with modem, coupler 07 KP 95 and central unit

The following figures show two application examples for single–channel and redundant configuration. Attention must be paid to the following in detail:

- The earthing measures
- The connection of the communication processor 07 KP 95 to the modem(s).
- Looping through the supply voltage (24 V DC) from the 07 KT 93 to the 07 KP 95 R101
- Earthing the switch cabinet mains sockets
- Using the AF100 bus with coaxial cable

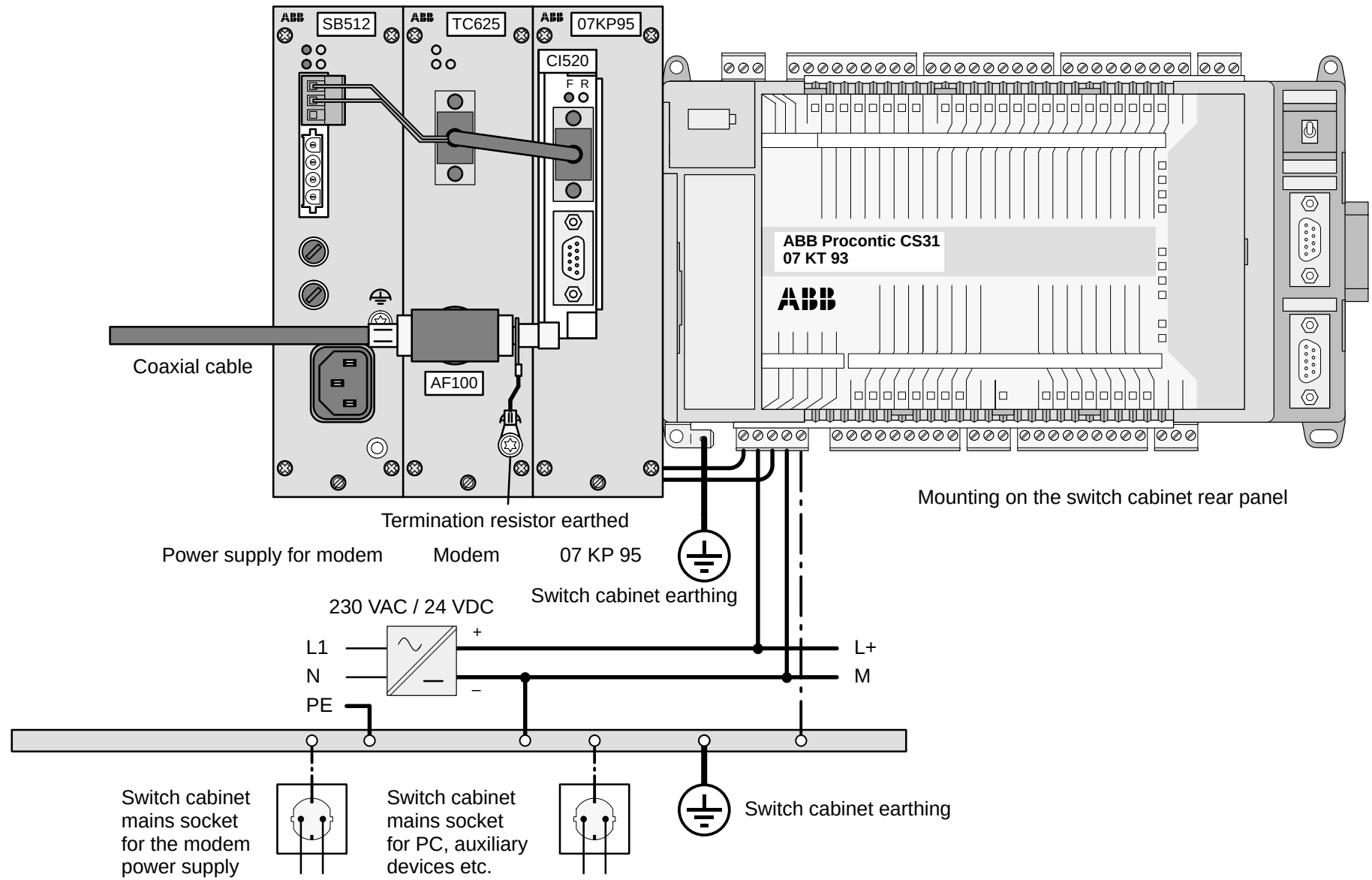


Fig. 3: Application example of an AF100 coupling with modem, coupler and central unit (typical switch cabinet configuration)

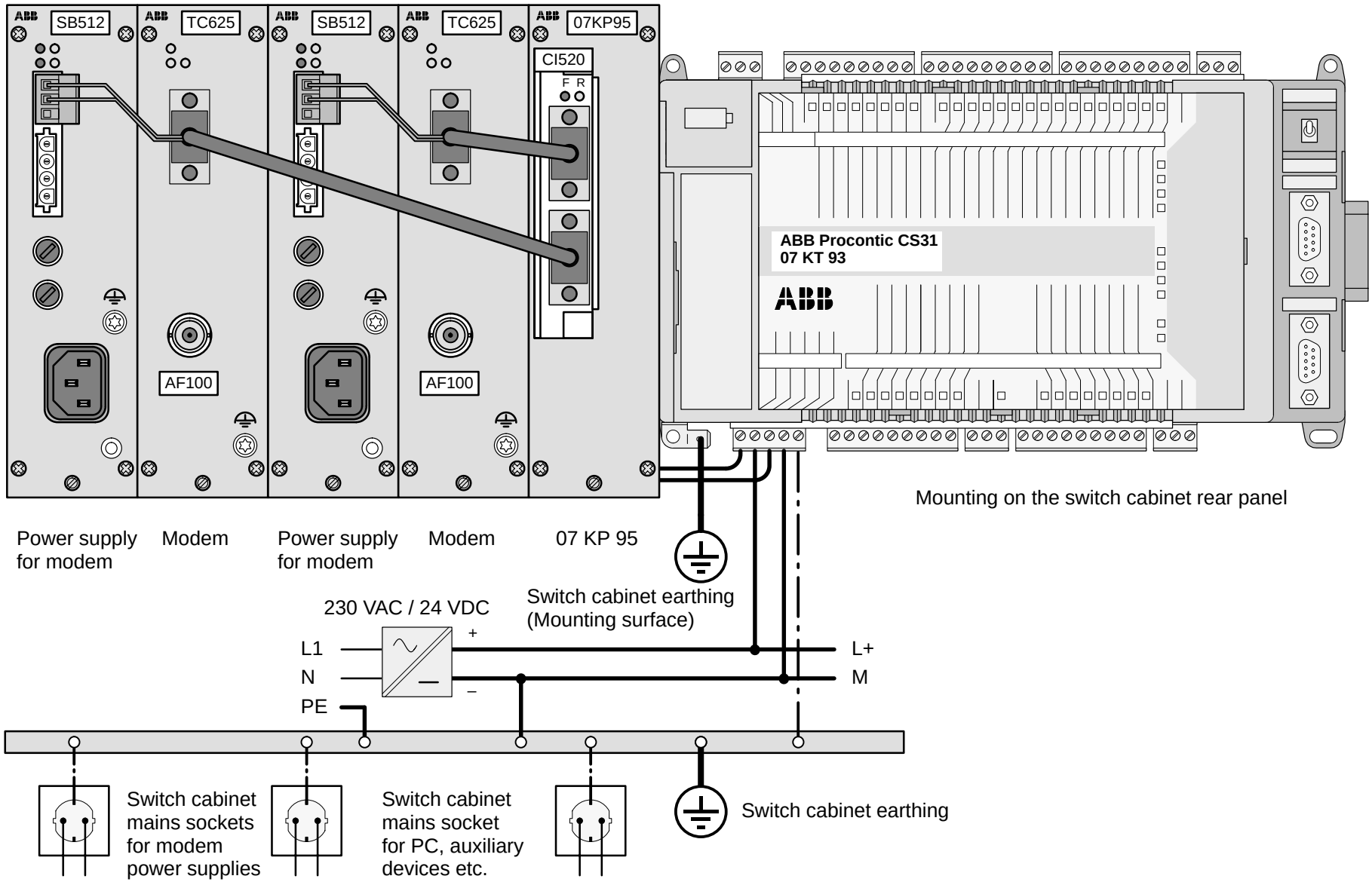


Fig. 4: Application examole of an AF100 coupling with modems, coupler and central unit, redundant configuration (typical switch cabinet configuration)

1.5.2 Connection of the supply voltage 24 V DC

As shown in Fig. 3 and Fig. 4, the supply voltage for the 07 KP 95 is looped through from the CS31 central unit (red wire = L+, blue wire = M).

1.5.3 Networking interface

The networking interface, a special parallel interface, allows the 07 KP 95 communication processor to be connected to ABB Procontic CS31 central units 07 KT 93. The housing of the communication processor is connected to the housing of the ABB Procontic central unit by a snap–fit connection. The electrical connection is via a 40–pole ribbon cable with socket connector, soldered onto the 07 KP 95 R101 side.

Note: Attachment and disconnection of units on the networking interface may only be performed when all supply voltages are switched off.

Mounting the communication processor at the networking interface

1. Detach the cover on the central unit (e.g. 07 KT 93) from the networking interface.
2. Plug the socket strip of the 40–pole ribbon cable secured to the 07 KP 95 R101 onto the networking connector of the CS31 central unit.
3. Slide both units together.
4. Slide the replacement cover provided with the 07 KP 95 unit with its cut-out onto the networking interface.

1.5.4 Measures for RFI (Radio Frequency Interference)

– Installation in a metallic switch–gear cabinet

– Mains filters

1.7 Technical data

In general, the details in Section 1 ”System data and system structure” of volume 2 of the system description ”ABB Procontic CS31” apply as technical data. Supplementary and deviating data is listed below.

1.7.1 General data

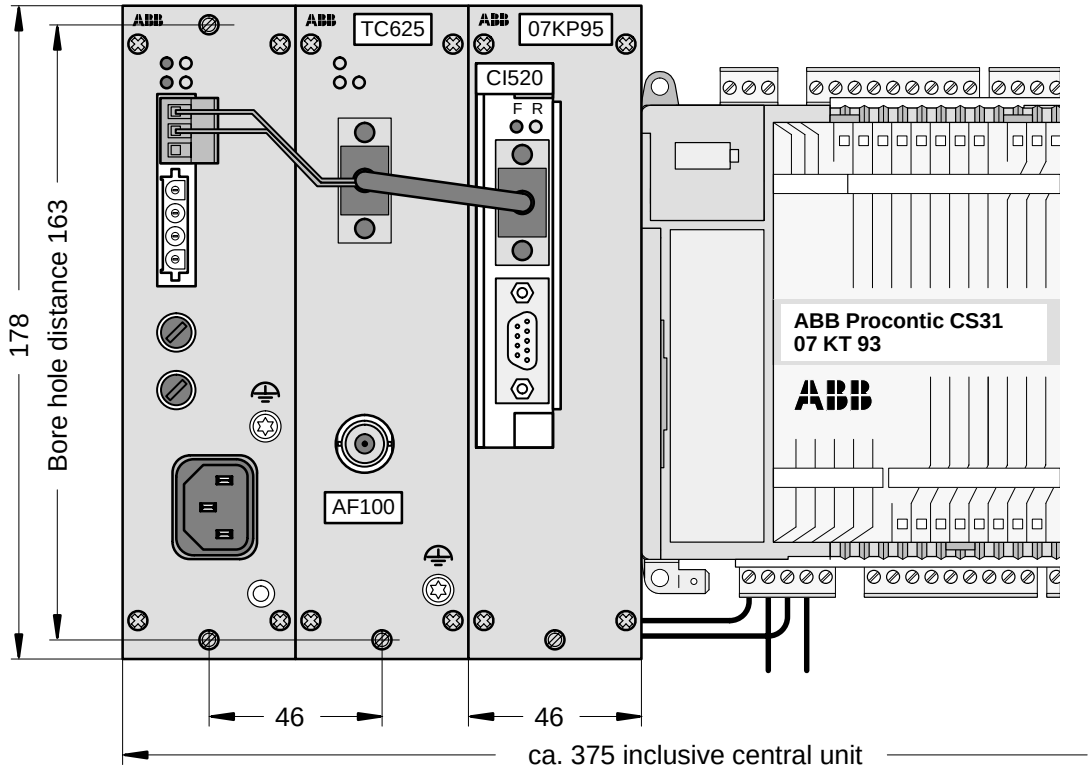
Number of parallel interfaces	1 networking interface for connecting to the ABB Procontic CS31 central unit
	1 interface for communication interface CI520
Note:	The communication interface CI520 must be ordered separately and is not supplied together with the 07 KP 95

1.7.2 Supply voltage 07 KP 95 R101

Rated supply voltage	24 V DC
Power dissipation	typ. 6 W
max. current consumption	
with rated voltage	250 mA
with supply voltage 30 V	200 mA
Protection against reversed terminal connection	yes

1.7.5 Mechanical data

Fastening on a mounting surface	by screws, distance 163 mm height of mounting surface 180 mm
Width x height x depth	46 x 180 x 170 mm
Weight	1.2 kg
Dimensions for mounting	see following drawing



All dimensions in mm.

The device is 170 mm deep without CI520 inserted. The depth is 191 mm with CI520 inserted. There must be enough space for interface connectors and cables.

Fig. 6: Outline dimensions of the communication processor 07 KP 95 R101, front view

1.7.6 Mounting hints

Mounting position	fastening on the switch cabinet rear panel
Cooling	The natural convection must not be hindered by cable ducts or other material mounted in the switch cabinet.

1.8 Ordering data

Communication processor 07 KP 95 R101	Order No. GJR5 2520 00 R0101
Scope of delivery	Communication processor 07 KP 95 R0101 Earthing instructions Replacement cover for the networking interface

Further literature

System description ABB Procontic CS31, English	FPTN 4400 04 R2001
Operating manual 07 KR 91 / 07 KT 92 / 07 KT 93, Eng.	GATS 1316 23 R2001

Software

907 KP 95 R0102, Documentation, CE library	GJP5 2065 00 R0102 (German documentation) GJP5 2066 00 R0102 (English documentation)

Additional components (see also Figures 3 and 4)

CI520 Communication interface

TC625 AF100 modem for coaxial cable (contains interface cable CI520 <–> TC625)

TC512 AF100 modem for twisted pair (contains interface cable CI520 <–> TC512)

SB512 Power supply unit for modem

These components can be ordered under the following address:

ABB Industrietechnik AG
Abteilung IND / OM
Dudenstraße 44–46
D–68167 Mannheim
Tel.: +49 621 381 1847 (Mr. Bräuler)

Additional literature

User's Guide Advant Fieldbus 100	Document 3BSE 000 506R0101 (English)
Installation Rules	Document 3BSE 009 178R0001 (English)

Installation

ABB Procontic CS31
Intelligent Decentralized Automation System

907 KP 95
CE definitions for the communication processor 07 KP 95

**ABB Schalt–
und Steuerungstechnik**

Contents

1 Installation of the CE definitions 907 KP 95

1.1 Contents of the diskette 1–1
1.2 Installation of the CE definitions 1–1

1 Installation of the CE definitions 907 KP 95

Programming of the communication module 07 KP 95 is done via PC with the programming system 907 PC 331.

All connection elements, which are necessary for operation of the 07 KP 95 are delivered on a 3.5" diskette together with this description.

During installation, the write protection of the diskette must not be switched on.

1.1 Contents of the diskette

The diskette contains

- CE definitions AF100, DSPIN, DSPOUT, DWREAL and REALDW for 907 PC 331

1.2 Installation of the CE definitions

Proceed as follows to install the CE library:

- Select the directory of 907 PC 331 for CS31:

  ```
  C:\>cd\abb-sps\cs31
  C:\ABB-SPS\CS31> _
  ```

- Up to version 04/96 of the software 907 PC 331 R302 the following command must be entered:

  ```
  COPY A:\MPST_KR1.TRS
  ```

  In doing so, the mentioned file will be copied into the directory C:\ABB–SPS\CS31. With later versions of 907 PC 331 the file must not be copied.

- Start 907 PC 331 for CS31:

  ```
  C:\ABB-SPS\CS31> cs31
  ```

- Select any project:

- Enter the name of the library into which you wish to put the connection elements AF100, DSPIN, DSPOUT, DWREAL and REALDW as the library name, e.g.: BIB\CS31. Now leave the project data editor with <ESC>. The main menu of 907 PC 331 now appears.

- Select the menu point:
  'Library/Read manufacturer library'. The computer asks you about the path of the block to be read. Delete the statement for the path name and enter the following:

  A: 907KP95E

- The computer now reads in the library.

The necessary connection elements for the 07 KP 95 are now available in the library "BIB\CS31".

Examples

ABB Procontic CS31
Intelligent Decentralized Automation System

907 KP 95
CE definitions for the communication processor 07 KP 95

**ABB Schalt–
und Steuerungstechnik**

Table of Contents

1 Examples

1.1 Communication between AC110 and 07 KT 93 R171 via AF100 1

1 Examples for the 07 KP 95

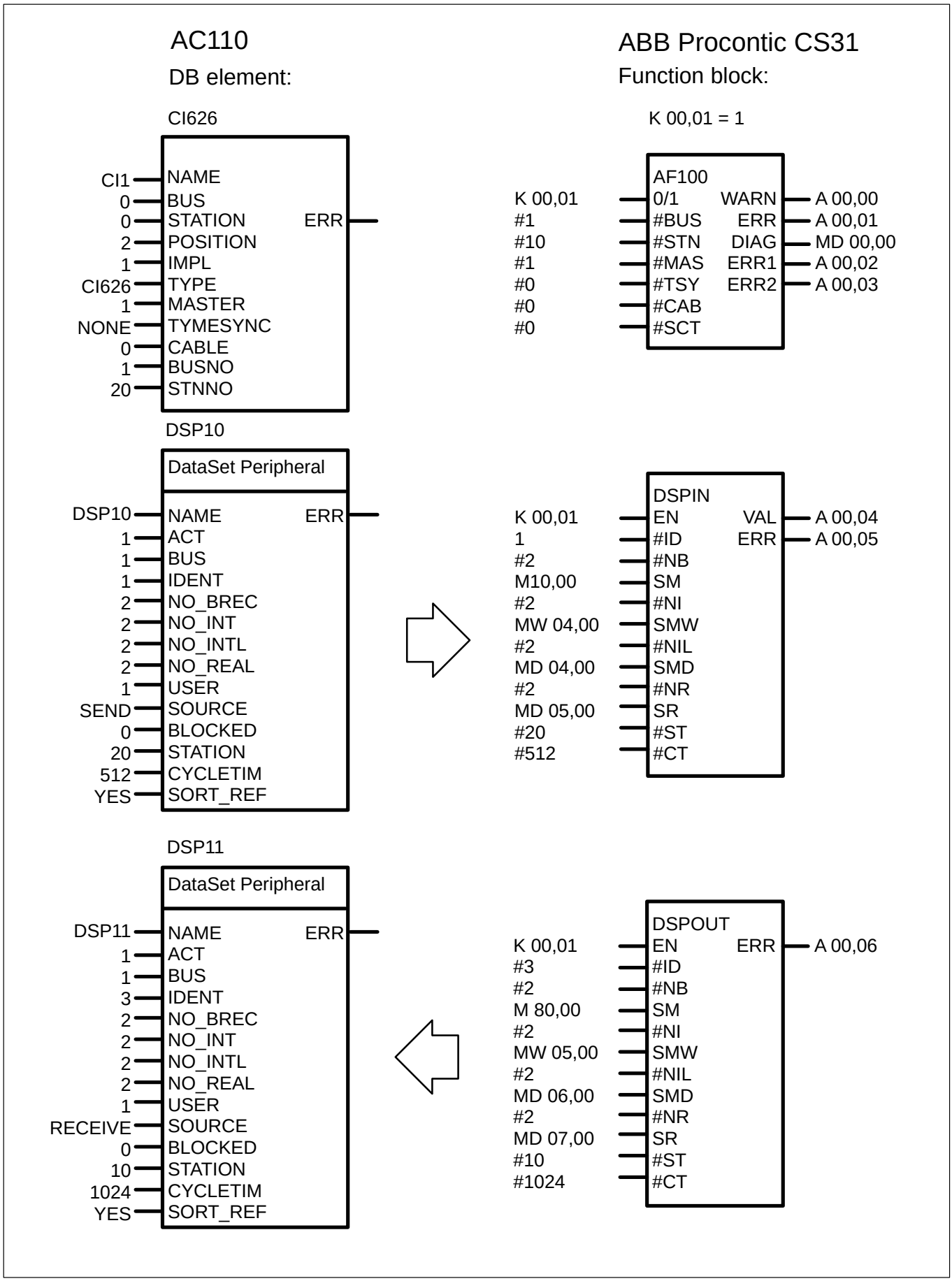
1.1 Communication between AC110 and 07 KT 93 R171 via AF100

For the transmission of cyclic data on the Advant controller side the data bank element DSP (Data Set Peripheral) is available. Each DSP can contain up to 8 data elements (DATs) of the types boolean, integer, integer long or real. At the data bank element it is defined the number of DATs, the transmission interval, the direction (sending or receiving DSP), the identification and the station number. In the same way, there are on the CS31 side the function blocks DSPIN (receiving DSP) and DSPOUT (sending DSP).

The inputs IDENT and STATION of the DB element DSP (or #ID and #ST of the connection element DSPIN/ DSPOUT) define the unambiguous identification of the DSP at the AF100 bus. At each bus, this identification may only be used by **one** DSPOUT block (or sending DSP for the Advant controller), but it can be used by **several** DSPIN blocks (or receiving DSPs for the Advant controller).

In order to guarantee an error-free communication, the values for IDENT, STATION, CYCLETIM, NO_BREC, NO_INT, NO_INTL and NO_REAL of the DB element ”sending DSP” must be equal to the values for #ID, #ST, #CT, #NB, #NI, #NIL and #NR of the corresponding function block DSPIN. For the same reason, the values for IDENT, STATION, CYCLETIM, NO_BREC, NO_INT, NO_INTL and NO_REAL of the DB element ”receiving DSP” must be equal to the values for #ID, #ST, #CT, #NB, #NI, #NIL and #NR of the corresponding function block DSPOUT. The input SORT_REF must be on ”YES” at the DSPs.

At the DB element CI626, the value at the input BUSNO must be equal to the value of the input BUS at the corresponding DSP. On the CS31 side, the input #BUS of the connection element AF100 has no significance.


AC110
DB element:
ABB Procontic CS31
Function block:
CI626
CI1
0
0
2
1
CI626
1
NONE
0
1
20
NAME
BUS
STATION
POSITION
IMPL
TYPE
MASTER
TYMESYNC
CABLE
BUSNO
STNNO
ERR
K 00,01 = 1
AF100
K 00,01
#1
#10
#1
#0
#0
#0
0/1
#BUS
#STN
#MAS
#TSY
#CAB
#SCT
WARN
ERR
DIAG
ERR1
ERR2
A 00,00
A 00,01
MD 00,00
A 00,02
A 00,03
DSP10
DataSet Peripheral
DSP10
1
1
1
2
2
2
2
1
SEND
0
20
512
YES
NAME
ACT
BUS
IDENT
NO_BREC
NO_INT
NO_INTL
NO_REAL
USER
SOURCE
BLOCKED
STATION
CYCLETIM
SORT_REF
ERR
DSPIN
K 00,01
1
#2
M10,00
#2
MW 04,00
#2
MD 04,00
#2
MD 05,00
#20
#512
EN
#ID
#NB
SM
#NI
SMW
#NIL
SMD
#NR
SR
#ST
#CT
VAL
ERR
A 00,04
A 00,05
DSP11
DataSet Peripheral
DSP11
1
1
3
2
2
2
2
1
RECEIVE
0
10
1024
YES
NAME
ACT
BUS
IDENT
NO_BREC
NO_INT
NO_INTL
NO_REAL
USER
SOURCE
BLOCKED
STATION
CYCLETIM
SORT_REF
ERR
DSPOUT
K 00,01
#3
#2
M 80,00
#2
MW 05,00
#2
MD 06,00
#2
MD 07,00
#10
#1024
EN
#ID
#NB
SM
#NI
SMW
#NIL
SMD
#NR
SR
#ST
#CT
ERR
A 00,06

Connection elements

ABB Procontic CS31
Intelligent Decentralized Automation System

907 KP 95
CE definitions for the communication processor 07 KP 95

**ABB Schalt–
und Steuerungstechnik**

Contents

Connection elements

AF100 Initialization of the AF100 coupler
07 KP 95 3

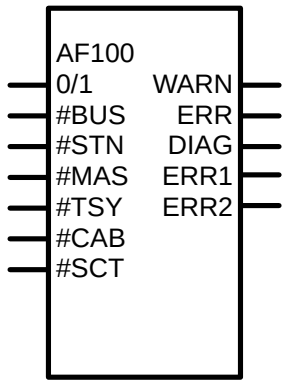
DSPIN Read DSP from the AF100 coupler
07 KP 95 5

DSPOUT Write DSP to the AF100 coupler
07 KP 95 8

DWREAL Double word to Real conversion 11

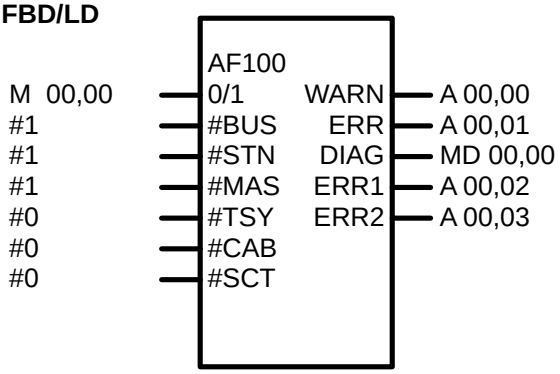
REALDW Real to double word conversion 12

FBD/LD



Example

FBD/LD



IL

```
!BA     0
AF100
        M 00,00
        #1
        #1
        #1
        #0
        #0
        #0
        A 00,00
        A 00,01
        MD 00,00
        A 00,02
        A 00,03
```

Parameters

0/1	BINARY	E, M, A, K, S	Enable block processing
#BUS	DIRECT CONSTANT	#, #H	Bus number; valid values: 1...255 insignificant for CS31
#STN	DIRECT CONSTANT	#, #H	Own station number; valid values: 1...80
#MAS	DIRECT CONSTANT	#, #H	AF100 bus master/slave: #0: bus slave, #1: bus master
#TSY	DIRECT CONSTANT	#, #H	Reserved; valid value: #0
#CAB	DIRECT CONSTANT	#, #H	#0: no redundant AF100 bus (1 cable) #1: redundant AF100 bus (2 cables)
#SCT	DIRECT CONSTANT	#, #H	Reserved; valid value: #0
WARN	BINARY	A, M	Warning (not a fatal error)
ERR	BINARY	A, M	An error has occurred (hardware or configuration)
DIAG	DOUBLE WORD	MD	Diagnosis
ERR1	BINARY	A, M	WARN = 1 and ERR1 = 1: redundant cable 1 failed
ERR2	BINARY	A, M	WARN = 1 and ERR2 = 1: redundant cable 2 failed

Description

The function block initializes the AF100 coupler 07 KP 95.

Important note:
During program modifications on running programs the AF100 function block must not be deleted, and the inputs of the AF100 function block must not be altered.

0/1 BINARY
After an 0/1 edge at the input 0/1 the AF100 coupler is initialized to the relevant values. After initialization, further 0/1 edges are ignored.

#BUS DIRECT CONSTANT
At the input BUS, the number of the AF100 bus is defined. This input has no meaning in connection with CS31. The coupler can contain only 1 CI520.
Valid values: $1 \leq BUS \leq 255$

#STN DIRECT CONSTANT
At the input #STN, the own station number is given.
Valid values: 1 ≤ #STN ≤ 80

#MAS DIRECT CONSTANT
At the input #MAS it is given whether the coupler is a bus master or a bus slave.
Values: #0: bus slave, #1: bus master

#TSY DIRECT CONSTANT
The input #TSY is a reserved input.
Valid value: **#0**

#CAB DIRECT CONSTANT
At the input #CAB it is defined, whether the AF100 bus is configured redundant or not.
Values: #0: singe–channel, #1: redundant

#SCT DIRECT CONSTANT
The input #SCT is a reserved input.
Valid value: **#0**

WARN BINARY
At the output WARN it is indicated, whether a warning has appeared during operation (see DIAG).

ERR BINARY
At the output ERR it is indicated, whether an error has appeared during operation (see DIAG).

DIAG DOUBLE WORD
At the output DIAG, the diagnosis information is indicated. The output is coded binary. It is possible that several bits are set to 1 in the diagnosis double word (DIAG = 65, i.e. ACT = 1 and CRA = 1 (bit 0 and bit 6)).

Meaning of the bits in the double word:

DIAG = 1: the coupler is active (ACT); if the coupler is not active, WARN is set to 1 (bit 0 of DIAG = 1).
DIAG = 2: severe error (SE); a SE causes ERR = 1 (bit 1 of DIAG = 1).
DIAG = 4: hardware error (HWE); a HWE causes WARN = 1 (bit 2 of DIAG = 1).
DIAG = 8: software error (SWE); an SWE causes ERR = 1 (bit 3 of DIAG = 1).
DIAG = 16: peripheral hardware error (PHE); a PHE causes WARN = 1 (bit 4 of DIAG = 1).
DIAG = 32: process errors (PRE); a PRE causes WARN = 1 (bit 5 of DIAG = 1).
DIAG = 64: cable redundancy available (CRA) (bit 6 of DIAG = 1).
DIAG = 128: redundant cable 1 failed (RC1); an RC1 causes WARN = 1 (bit 7 of DIAG = 1).
DIAG = 256: redundant cable 2 failed (RC2); an RC2 causes WARN = 1 (bit 8 of DIAG = 1).
DIAG = 512: redundant power A failure (RPA); an RPA causes WARN = 1 (bit 9 of DIAG = 1).
DIAG = 1024: redundant power B failure (RPB); an RPB causes WARN = 1 (bit 10 of DIAG = 1).
DIAG = 16384: general error (GE); a GE causes ERR = 1 (bit 14 of DIAG = 1).
DIAG = -32768: general warning (GW); a GW causes WARN = 1 (bit 15 of DIAG = 1).

ERR1 BINARY
The output ERR1 indicates, that the redundant cable 1 is defective (WARN = 1 and ERR1 = 1).

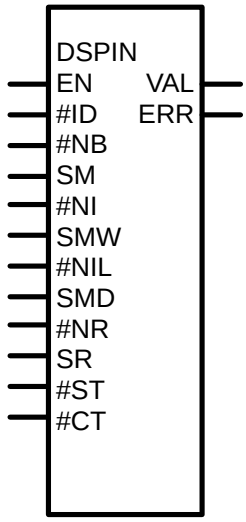
ERR2 BINARY
The output ERR2 indicates, that the redundant cable 2 is defective (WARN = 1 and ERR2 = 1).

The inputs and outputs can neither be doubled nor inverted.

CE data

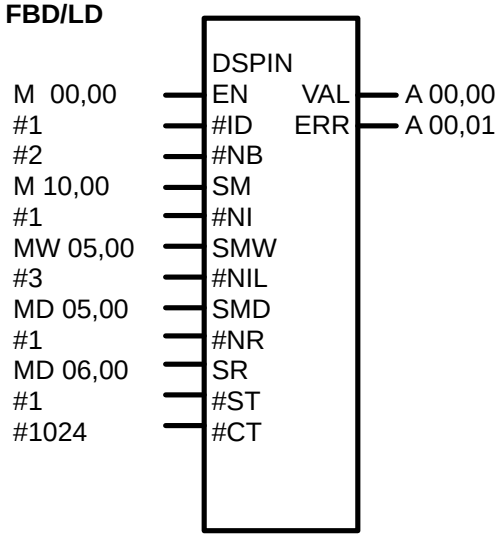
Runtime:	07 KR 91/07 KT 92/07 KT 93
Basic runtime:	µs
Additional runtime:	
Updating of the outputs:	yes
Number of historical values:	1 word
Available as of:	ABB Procontic CS31 07 KR 91 R202/R252 index c 07 KT 92 R202/R262 index c 07 KT 93 R101 index f 07 KT 93 R171 index f

FBD/LD



Example

FBD/LD



IL

```
!BA     0
DSPIN
        #0
        M 00,00
        #1
        #2
        M 10,00
        #1
        MW 05,00
        #3
        MD 05,00
        #0
        MD 06,00
        #1
        #1024
        A 00,00
        A 00,01
```

Parameters

EN	BINARY	E, M, A, K, S	Enable block processing
#ID	DIRECT CONSTANT	#, #H	Identifier, results together with #ST into the definite identification of the DSP on the AF100 bus; valid values: 1...50 ***)**
#NB	DIRECT CONSTANT	#, #H	Number of the packed binary values (32 values) of the DSP; valid values: 0...8
SM	BINARY	E, M, A	First flag of the binary range
#NI	DIRECT CONSTANT	#, #H	Number of the word values; valid values: 0...8
SMW	WORD	MW	First word flag of the word range
#NIL	DIRECT CONSTANT	#, #H	Number of the double words of the DSP; valid values: 0...8
SMD	DOUBLE WORD	MD	First double word flag of the double word range
#NR	DIRECT CONSTANT	#, #H	Number of real values; valid values: 0...8
SR	DOUBLE WORD valid values for #NB, #NI, #NIL and #NR: #NB + #NI + #NIL + #NR $\leq$ 8 **and** #NB + #NI + #NIL + #NR $\geq$ 1	MD	First double word flag of the real range
#ST	DIRECT CONSTANT	#, #H	Station address; valid values: 1...80 ***)** (128 for the status of an other station)
#CT	DIRECT CONSTANT	#, #H	Transmission interval (cycle time) in ms; valid values: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096
VAL	BINARY	A, M	Data are valid
ERR	BINARY	A, M	An error has occurred

***)** With #ST = 128, #ID = station address of the desired station (valid values 1...80), #NB = #NI = #NR = 0 and #NIL = 1 it is possible, to interrogate the status of the station using the address #ID. The status (32 bits) is then available under SMD. The status is coded binary and equals the DIAG output of the AF100 function block.

Description

The function block DSPIN reads a DSP (data set peripheral) from the AF100 coupler 07 KP 95 (Advant Fieldbus 100 coupler). An other station sends this DSP over the AF100 bus. The function block DSPIN is similar to the Element Receiving DSP of the Advant controllers.

The inputs #NB, SM through #NR, SR define the composition of the DSP. The inputs #ID and #ST define the definite identification of the DSP on the AF100 bus. For each bus, this identification may be used only by **one** DSPOUT block (or Sending DSP for the Advant controller), but by **several** DSPIN blocks (or Receiving DSPs for the Advant Controllers).

The DSP, which is read by the DSPIN function block, is written by an other station with the DSPOUT function block (or sending DSP element). The values #ID, #ST, #NB, #NI, #NIL, #NR of the DSPIN function block must be equal to the values #ID, #ST, #NB, #NI, #NIL, #NR of the corresponding DSPOUT function block (sending DSP element).

Important note:
During program modifications on running programs the DSPIN function block must neither be deleted nor added, and the inputs of the DSPIN function block must not be altered.

The enabled function block (input EN = 1) reads a DSP from the AF100 coupler 07 KP 95.

EN BINARY
Enable block processing. Values:

EN = 0:	The block is not processed. The outputs VAL and ERR are reset to zero.
EN = 1:	The block is processed.

#ID DIRECT CONSTANT
At the input #ID the identifier of of the DSP is defined. This identifier results together with the input #ST into the definite identification of the DSP on the AF100 bus (for status of an other station see input #ST).
Valid values: 1# $\leq$ ID $\leq$ 50

Important note:
The values #ID, #ST, #NB, #NI, #NIL, #NR must be equal to the values #ID, #ST, #NB, #NI, #NIL, #NR of the corresponding DSPOUT function block or the corresponding sending DSP element
Valid values: #NB + #NI + #NIL + #NR $\leq$ 8 **and**
#NB + #NI + #NIL + #NR $\geq$ 1

#NB DIRECT CONSTANT
At the input #NB (number of booleans), the number of packed binary values (32 values) of the DSP is defined.
Valid values: 0 $\leq$ #NB $\leq$ 8

SM BINARY
At the input SM, the first flag of the binary flag range is given, where the block stores the packed binary values.
Example: #NI = 2 and SM = M 01,00
the packed binary values (64 values) are stored in the flag range from M 01,00 to M 04,15.

#NI DIRECT CONSTANT
At the input #NI (number of integer), the number of words of the DSP is given.
Valid values: 0 $\leq$ #NI $\leq$ 8

SMW WORD
At the input SMW, the first flag of the word flag range is given, where the block stores the word values.

#NIL DIRECT CONSTANT
At the input #NIL (number of integer long), the number of double words of the DSP is given.
Valid values: 0 $\leq$ #NIL $\leq$ 8

SMD DOUBLE WORD
At the input SMD, the first flag of the double word flag range is given, where the block stores the double word values.

#NR DIRECT CONSTANT
At the input #NR (number of real), the number of real values of the DSP is given.
Valid values: 0 $\leq$ #NR $\leq$ 8

SR DOUBLE WORD
At the input SR, the first flag of the double word flag range is given, where the function block stores the real values. For further processing of the real values (IEEE 754), they must be converted into double word values with the **REALDW** function block.

#ST DIRECT CONSTANT
At the input #ST the station address is defined. This address results together with the input #ID into the definite identification of the DSP on the AF100 bus.
Valid values: 1 $\leq$ #ST $\leq$ 80
With #ST = 128, #ID = station address of the desired station (valid values 1...80), #NB = #NI = #NR = 0 and #NIL = 1 it is possible, to interrogate the status of the station using the address #ID. The status (32 bits) is then available under SMD. The status is coded binary and equals the DIAG output of the AF100 function block.

#CT DIRECT CONSTANT
At the input #CT the transmission interval (cycle time) is defined in **ms**. This input defines, how many times a DSP is transmitted on the bus.
Valid values: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096

VAL BINARY
At the output VAL it is indicated, that the data of the configured flag ranges are valid. The output VAL is reset to zero, if within (3 * #CT) no valid data has been received.

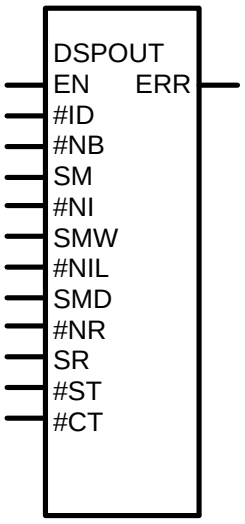
ERR BINARY
At the ERR output it is indicated, whether an error has occurred.
In case of an error (partner is no 07 KP 95 or the AF100 coupler 07 KP 95 disables the dual–port RAM), the output ERR is set to 1.

The inputs and outputs can neither be doubled nor inverted.

CE data

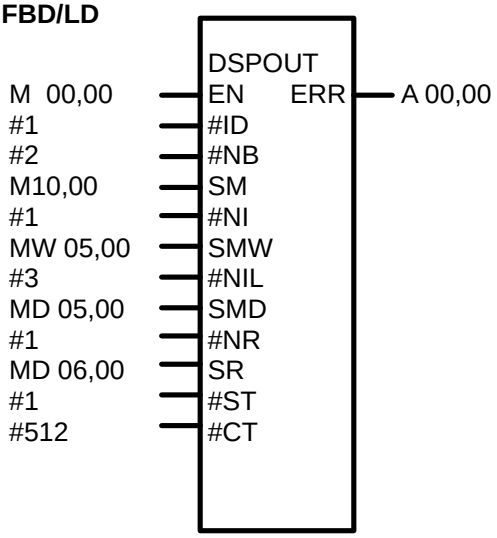
Runtime:	07 KR 91/07 KT 92/07 KT 93
Basic runtime:	µs
Additional runtime:	
Updating of the outputs:	yes
Number of historical values:	0 words
Available as of:	ABB Procontic CS31 07 KR 91 R202/R252 index c 07 KT 92 R202/R262 index c 07 KT 93 R101 index f 07 KT 93 R171 index f

FBD/LD



Example

FBD/LD



IL

```
!BA     0
DSPOUT
        #0
        M 00,00
        #1
        #2
        M 10,00
        #1
        MW 05,00
        #3
        MD 05,00
        #1
        MD 06,00
        #1
        #512
        A 00,00
```

Parameters

EN	BINARY	E, M, A, K, S	Enable block processing
#ID	DIRECT CONSTANT	#, #H	Identifier, results together with #ST into the definite identification of the DSP on the AF100 bus; valid values: 1...50
#NB	DIRECT CONSTANT	#, #H	Number of the packed binary values (32 values) of the DSP; valid values: 0...8
SM	BINARY	E, M, A	First flag of the binary range
#NI	DIRECT CONSTANT	#, #H	Number of the word values; valid values: 0...8
SMW	WORD	MW	First word flag of the word range
#NIL	DIRECT CONSTANT	#, #H	Number of the double words of the DSP; valid values: 0...8
SMD	DOUBLE WORD	MD	First double word flag of the double word range
#NR	DIRECT CONSTANT	#, #H	Number of real values; valid values: 0...8
SR	DOUBLE WORD valid values for #NB, #NI, #NIL and #NR: #NB + #NI + #NIL + #NR $\leq$ 8 **and** #NB + #NI + #NIL + #NR $\geq$ 1	MD	First double word flag of the real range
#ST	DIRECT CONSTANT	#, #H	Station address; valid values: 1...80
#CT	DIRECT CONSTANT	#, #H	Transmission interval (cycle time) in ms; valid values: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096
ERR	BINARY	A, M	An error has occurred

Description

The function block DSPOUT writes a DSP (data set peripheral) to the AF100 coupler 07 KP 95 (Advant Fieldbus 100 coupler). This DSP can be received from other stations over the AF100 bus. The function block DSPOUT is similar to the Element Sending DSP of the Advant controllers.

The inputs #NB, SM through #NR, SR define the composition of the DSP. The inputs #ID and #ST define the definite identification of the DSP on the AF100 bus. For each bus, this identification may be used only by **one** DSPOUT block (or Sending DSP for the Advant controller), but by **several** DSPIN blocks (or Receiving DSPs for the Advant Controllers).

The DSP, which is written by the DSPOUT function block, is read by an other station with the DSPIN function block (or receiving DSP element). The values #ID, #ST, #NB, #NI, #NIL, #NR of the DSPIN function block (receiving DSP element) must be equal to the values #ID, #ST, #NB, #NI, #NIL, #NR of the corresponding DSPOUT function block.

Important note:
During program modifications on running programs the DSPOUT function block must neither be deleted nor added, and the inputs of the DSPOUT function block must not be altered.

The enabled function block (input EN = 1) writes a DSP to the AF100 coupler 07 KP 95.

EN BINARY
Enable block processing. Values:

EN = 0:	The block is not processed. The output ERR is reset to zero.
EN = 1:	The block is processed.

#ID DIRECT CONSTANT
At the input #ID the identifier of of the DSP is defined. This identifier results together with the input #ST into the definite identification of the DSP on the AF100 bus.
Valid values: $1 \leq \#ID \leq 50$

Important note:
The values #ID, #ST, #NB, #NI, #NIL, #NR must be equal to the values #ID, #ST, #NB, #NI, #NIL, #NR of the corresponding DSPIN function block or the corresponding receiving DSP element
Valid values: $\#NB + \#NI + \#NIL + \#NR \leq 8$ **and**
$\#NB + \#NI + \#NIL + \#NR \geq 1$

#NB DIRECT CONSTANT
At the input #NB (number of booleans), the number of packed binary values (32 values) of the DSP is defined, which are to be sent.
Valid values: $0 \leq \#NB \leq 8$

SM BINARY
At the input SM, the first flag of the binary flag range is given, which are to be sent.
Example: #NI = 2 and SM = M 01,00
the packed binary values from M 01,00 to M 04,15 (64 values) are sent within the DSP.

#NI DIRECT CONSTANT
At the input #NI (number of integer), the number of words of the DSP is given, which are to be sent.
Valid values: $0 \leq \#NI \leq 8$

SMW WORD
At the input SMW, the first flag of the word flag range is given, which is to be sent.

#NIL DIRECT CONSTANT
At the input #NIL (number of integer long), the number of double words of the DSP is given, which are to be sent.
Valid values: $0 \leq \#NIL \leq 8$

SMD DOUBLE WORD
At the input SMD, the first flag of the double word flag range is given, which is to be sent.

#NR DIRECT CONSTANT
At the input #NR (number of real), the number of real values of the DSP is given, which are to be sent.
Valid values: $0 \leq \#NR \leq 8$

SR DOUBLE WORD
At the input SR, the first flag of the double word flag range is given, which is to be sent. Previously, the processed double words must be converted into the corresponding real values (IEEE 754), using the **DWREAL** function block.

#ST DIRECT CONSTANT
At the input #ST the station address is defined. This address results together with the input #ID into the definite identification of the DSP on the AF100 bus.
Valid values: $1 \leq \#ST \leq 80$

#CT DIRECT CONSTANT
At the input #CT the transmission interval (cycle time) is defined in **ms**. This input defines, how many times a DSP is transmitted on the bus.
Valid values: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096

ERR BINARY
At the ERR output it is indicated, whether an error has occurred.

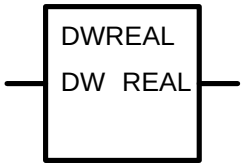
In case of an error (partner is no 07 KP 95 or the AF100 coupler 07 KP 95 disables the dual–port RAM), the output ERR is set to 1.

The inputs and outputs can neither be doubled nor inverted.

CE data

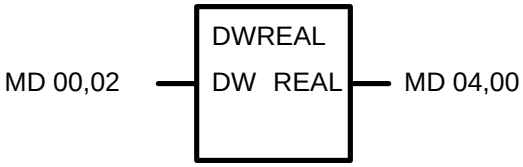
Runtime:	07 KR 91/07 KT 92/07 KT 93	
Basic runtime:	µs	
Additional runtime:		
Updating of the outputs:	yes	
Number of historical values:	0 words	
Available as of:	ABB Procontic CS31	07 KR 91 R202/R252 index c
		07 KT 92 R202/R262 index c
		07 KT 93 R101 index f
		07 KT 93 R171 index f

FBD/LD



Example

FBD/LD



IL

```
!BA      0
DWREAL
         MD 00,02
         MD  04,00
```

Parameter

E1	DOUBLE WORD	KD, MD	double word to be converted
A1	DOUBLE WORD	MD	result of the conversion, double word

Description

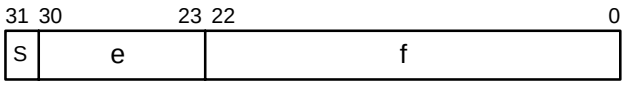
The value of the double word operand E1 is converted into a real value (IEEE 754). The result is allocated to the double word operand at the output A1. This function module is appropriate in conjunction with the function module **DSPOUT** only. With that it is possible to transmit real values via the Advant Fieldbus 100.

E1 DOUBLE WORD
The value of the double word operand at E1 input is converted into a real value (IEEE 754). The result is available as value of the output operand A1.

A1 DOUBLE WORD
The real value (IEEE 754) of E1 is available at output A1.

The inputs and outputs can neither be doubled nor inverted.

Data formats in accordance with IEEE754



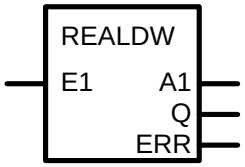
s: sign (1 bit)
e: biased exponent (8 bits)
f: significant (23 bits)

e	f	represented value
255	!0	Not a Number, NaN
255	0	$(-1)^s * \infty$
1...254		$(-1)^s * 2^{e-127} * (1.f)$
0	!0	$(-1)^s * 2^{-126} * (0.f)$
0	0	$(-1)^s * 0$, zero

CE Data

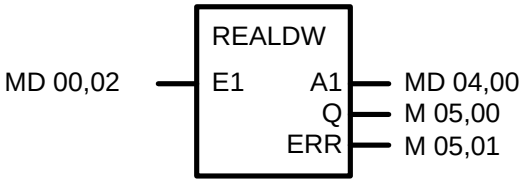
Run time:	07 KR 91 / 07 KT 92 / 07 KT 93
Basic run time:	27 to 65 µs
Additional run time:	–
Output updating:	yes
Number of historical values:	0 words
Available as of:	ABB Procontic CS31 07 KR 91 R202/R252 index b 07 KT 92 R202/R262 07 KT 93 R101 index d 07 KT 93 R171 index c

FBD/LD



Example

FBD/IL



IL

```
!BA       0
REALDW
          MD 00,02
          MD  04,00
          M 05,00
          M 05,01
```

Parameter

E1	DOUBLE WORD	KD, MD	double word to be converted
A1	DOUBLE WORD	MD	result of the conversion, double word
Q	BINARY	A, M	result limited
ERR	BINARY	A, M	error occurred (Not a Number)

Description

The real value (IEEE 754) at input E1 is converted into a double word value. The result is allocated to the double word operand at the output A1. This function module is appropriate in conjunction with the function module **DSPIN** only. With that it is possible to transmit real values via the Advant Fieldbus 100.

The result is limited to maximum or minimum number range.
max. number range: + 2 147 483 647 ($7FFF\ FFFF_H$)
min. number range: – 2 147 483 647 ($8000\ 0001_H$)

E1 DOUBLE WORD
The real value (IEEE 754) at input E1 is converted into a double word value . The result is available as value of the output A1.

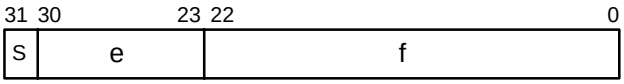
A1 DOUBLE WORD
The double word value of E1
is available at output A1.

Q BINARY
If a limitation took place, a 1 signal is allocated to the binary operand at output Q.
If no limitation took place, a 0 signal is allocated to the binary operand at output Q.

ERR BINARY
If the real value represents 'Not a Number', the following is valid:
A1 = 0 **and** Q = 0 **and** ERR = 1.

The inputs and outputs can neither be doubled nor inverted.

Data formats in accordance with IEEE754



s: sign (1 bit)
e: biased exponent (8 bits)
f: significant (23 bits)

e	f	represented value
255	!0	Not a Number, NaN
255	0	$(-1)^s * \infty$
1...254		$(-1)^s * 2^{e-127} * (1.f)$
0	!0	$(-1)^s * 2^{-126} * (0.f)$
0	0	$(-1)^s * 0$, zero

CE Data

Run time:	07 KR 91 / 07 KT 92 / 07 KT 93	
Basic run time:	35 to 66 µs	
Additional run time:	–	
Output updating:	yes	
Number of historical values:	0 words	
Available as of:	ABB Procontic CS31	07 KR 91 R202/R252 index b 07 KT 92 R202/R262 07 KT 93 R101 index d 07 KT 93 R171 index c

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